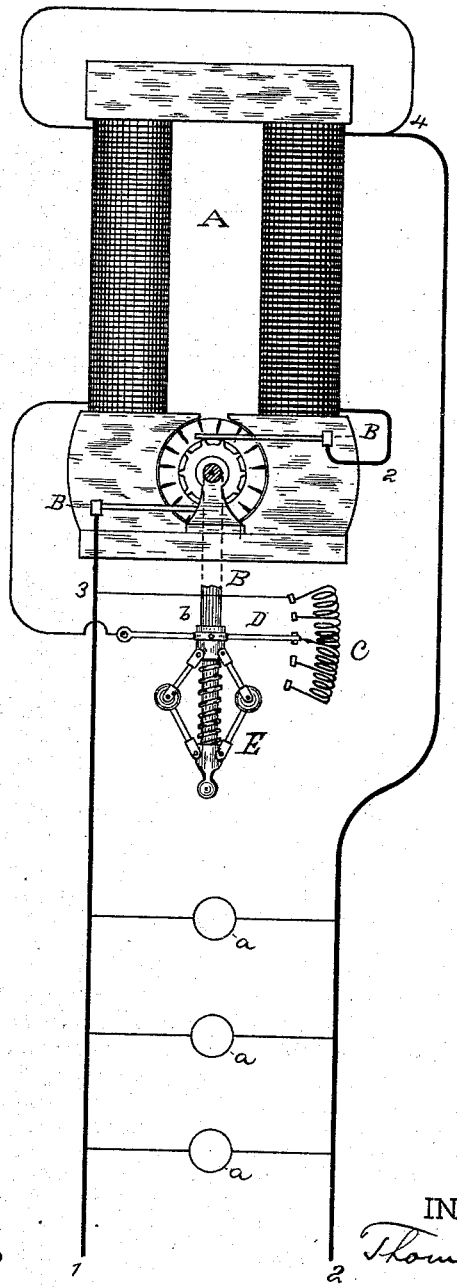
(No Model.)

T. A. EDISON.

REGULATOR FOR DYNAMO ELECTRIC MACHINES.

No. 278,413. Patented May 29, 1883.



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REGULATOR FOR DYNAMO-ELECTRIC MACHINES

SPECIFICATION forming part of Letters Patent No. 278,413, dated May 29, 1883.

Application filed December 8, 1882. (No model.)

To all whom it may concern:

Be it known that I, THOMAS A. EDISON, of Menlo Park, in the county of Middlesex and State of New Jersey, have invented a new and useful Improvement in Regulators for Dynamo-Electric Machines, (Case No. 521,) of which the following is a specification.

In my application No. 72,523 is set forth a method of regulating a dynamo-electric machine by placing a portion of its coils, formed of coarse wire, in the main circuit, and the remaining portion, composed of fine wire, in a multiple-arc circuit therefrom, whereby variations in the number of translating devices in circuit, by oppositely varying the current in the two portions in proper proportions, regulated the generation of current by the machine according to the requirements of the system.

My present invention relates to an improvement upon regulators of this kind, which regulate only for variations in number of translating devices, by which improvement I am enabled to regulate for variations in the speed of the armature, as well as for differences in the number of translating devices in circuit.

Such invention consists in combining with a dynamo-electric machine, having its field-magnet coils so connected that variations in current on the main line vary directly the energy of the magnet, mechanical means operated by variations in speed of the armature to regulate the current energizing the field-magnet, as required by such variations.

A simple and convenient manner of carrying out my invention consists in winding the field-magnet as above described, and placing in the multiple-arc circuit, which includes the fine-wire coils, a resistance adjustable by means of an arm carried by a spring-governor placed on the shaft of the armature, or attached to any other revolving portion of the apparatus. Such governor acts to throw out resistance when the speed of the armature is diminished, and to increase the resistance if the speed is too much increased.

My invention is illustrated in the accompanying drawing, which is a view partly in diagram of a dynamo-electric machine with the accompanying devices and circuits.

A is the field-magnet, and B B are the commutator-brushes, from which main conductors 1 2 lead in multiple-arc circuits, from which are placed lamps or other translating devices, *a a*. Conductor 2 is wound around one limb of magnet A, as shown, and a multiple-arc circuit, 3 4, of finer wire, includes the other limb; or the fine-wire circuit 3 4 could cover both limbs, and the coarse wire be wound above the whole, or a portion of it.

For convenience in drawing, a top view of the speed-regulating devices is shown, a portion of the armature-shaft B being shown in dotted lines.

C is an adjustable resistance in the circuit 3 4, and D an arm connected in said circuit for varying said resistance. The arm D is attached to the sleeve *b* of spring-governor E, attached to the armature-shaft B.

If the number of lamps or other translating devices in multiple arc in the system is increased, an increase of current is caused in the conductor 2 and a decrease in the fine-wire circuit 3 4, the excess of the increase over the decrease producing the proper increase in the energy of the field-magnet to meet the requirements of the additional number of translating devices. An opposite effect is produced by the removal of such devices. An increase in the speed of the motor which drives the armature of the machine would cause the generation of too much current for the system, and also would increase the current in both portions of the coils of the field-magnet, so that the generation of current would continue to increase. I therefore provide the governor E, which, when the speed of the armature increases, moves the arm D so as to increase the proportion of resistance C in the fine-wire circuit 3 4, thus decreasing the energy of the magnet and diminishing the generation of current to compensate for the increase caused by the increase of speed. An unusual decrease of speed causes the governor E to move the arm D in the other direction, so as to decrease the resistance C. The two regulators in combination, it will be seen, are sufficient to regulate for all the conditions of inequality of generation which can occur. It is evident that the same effect will be produced if the governor E is mounted on any other revolving portion of the apparatus and properly connected.

In my Patent No. 264,665 mechanical means

actuated by variations in speed are shown in connection with an electro-magnet in the main line, both acting upon an adjustable resistance, in the field-circuit of a generator. In this case the addition or removal of translating devices by varying the energy of the magnet in the main line, and thus adjusting the resistance, causes variations in the current in the field-magnet of the machine. By my present invention, however, I dispense with the regulating electro-magnet and place part of the coils of the field-magnet in the main circuit, so that the energy of such field-magnet is directly influenced and varied by changes in the number of translating devices in circuit, and it is to connections producing such direct variations that this invention is limited.

What I claim is—

1. The combination, with a dynamo-electric machine, of connections with its field-magnet coils, whereby variations in current in the main line, caused by the addition and removal of translating devices, act directly upon said field-magnet to vary its energy, and mechanical means operated by variations in the speed of the armature for varying the current energizing said magnet, substantially as set forth.

2. The combination of a dynamo-electric machine having a portion of its field-magnet coils included in the main circuit, translating devices arranged in multiple arc from said main circuit, a multiple-arc circuit, including the remaining portion of such field-magnet coils, and mechanical means operated by variations in the speed of the armature, and varying the current in said multiple-arc circuit, substantially as set forth.

3. The combination of a dynamo-electric machine having a portion of its field-magnet coils so connected that variations in current in the main line, caused by the addition and removal of translating devices, vary directly the energy of the magnet, a centrifugal governor, and an adjustable resistance varied by said governor to regulate the current in the remaining portion of said field-magnet coils according to variations in the speed of the armature, substantially as set forth.

4. The combination, with a dynamo-electric machine having a portion of the coils of its field-magnet included directly in the main circuit and the remainder in a multiple-arc circuit thereform, and translating devices arranged in multiple arc, of a centrifugal governor acting to vary the resistance of said multiple-arc circuit according to variations in the speed of said armature-shaft, substantially as set forth.

This specification signed and witnessed this 28th day of November, 1882.

THOS. A. EDISON.

Witnesses:

H. W. SEELY,

E. H. PYATT.